# A Scalable Approach to Data Management Education of Graduate Students


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DIL data information literacy


## Introduction

As part of the Data Information Literacy (DIL) project, funded by a grant from the Institute of Museum and Library Services (IMLS), the University of Minnesota (UMN) Libraries partnered with Purdue University, Cornell University, and the University of Oregon to identify:

- ✓ What data management and curation skills are needed by graduate students in the sciences to take advantage of opportunities in e-science?
- ✓ How can academic librarians contribute their expertise in information organization, dissemination and preservation to better serve modern science?

The UMN team worked with a structures research group in the Civil Engineering Department.

## Methodology

### Part 1. In-Depth Interviews (Spring 2012)

- ✓ **90-120 minutes**
- ✓ **4 graduate students**
- ✓ **1 faculty member**
- ✓ **Interview tools: z.umn.edu/dil**

Based on our findings[1] and an extensive literature review and environmental scan, we developed online course in Data Management.

### Part 2. Online Course (Fall/Sp 2012-13)

- ✓ **ScreenFlow and YouTube**
- ✓ **Google Docs, Forms, and Sites**

Our e-learning approach[2] to teaching data management skills can be scaled to a variety of disciplines - made easier with tools such as Google Sites allowing us to reuse the content.

## Case Study: Structural Engineering Graduate Student Needs

| DIL Need | Backup and Security | Documentation | Ownership | Sharing | Long-term Access |
|---|---|---|---|---|---|
| **Evidence** | Students stored data on laptops that do not always include backup strategies. | Students graduate and passed their data to the next student without context. | State-funded research projects created ownership confusion. | Students did not recognize the reuse potential of their data. | Some data was collected using proprietary file-formats. |

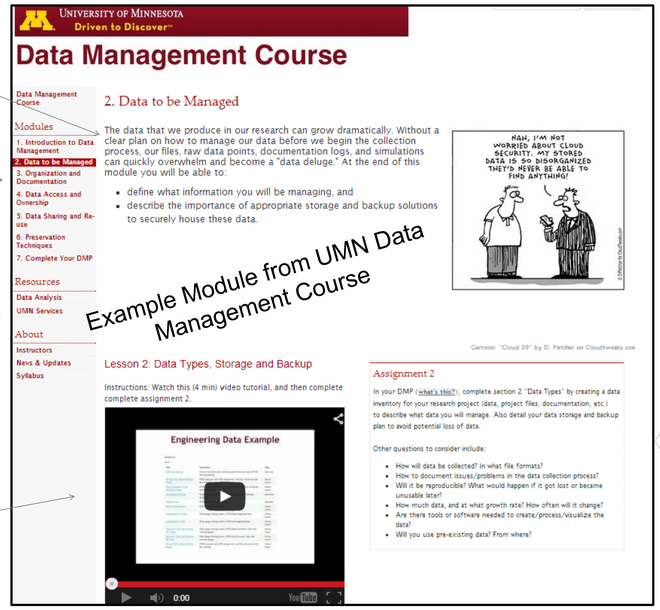
## Anatomy of the Online Data Management Course

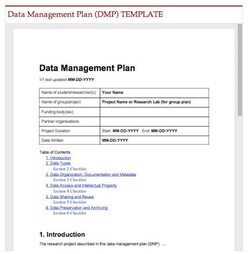
**Learning objectives** were identified from graduate student needs assessment.

**7 modules** map to Data Management Plan requirements of NSF and NIH.

**Resources** point to services outside the library.

**Lesson video** is self-contained and can be viewed on multiple devices.




**Assessment** is formative and students asynchronously complete a DMP template that instructors can view in a shared Google Doc.

## Enrollment in the First Year of the Data Management Course

**Online Course Enrollment and Completion Rates (Fall/Spring 2012-13)**

| | Enrolled | Discipline | Completion Rate | Notes |
|---|---|---|---|---|
| **Fall 2012*** | **11** | Structural Engineering | **45% (5)** | Two completed on time and three students deferred to the Spring. |
| **Spring 2013**** | **47** | 14 Sci/Eng Departments | **13% (6)** | Optional in-person lecture brought 13 participants to the library. |
| **Total** | **58** | **STEM Disciplines** | **19% (11)** | **Structural Engineering (6)<br>Chemistry (1)<br>Entomology (2)<br>Applied Economics (1)<br>Forestry Resources (1)** |

Participants that completed the course received a certificate and the Data Management Course logged into their UMN Training History.

Fall 2012 — Open to Structures graduate students (~20 total) in the Civil Eng Dept.

Spring 2013 — We broaden the course content to offer to all science & engineering graduate students.

## Want more? http://z.umn.edu/datamgmt


1. Johnston, L. and Jeffryes, J. (2013). "Data Management Skills Needed by Structural Engineering Students" J. Prof. Issues Eng. Educ. Pract., 10.1061/(ASCE)EI.1943-5541.0000154 (Feb. 13, 2013). http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29EI.1943-5541.0000154
2. Jeffryes, J. and Johnston, L. (2013). "An E-Learning Approach to Data Information Literacy Education." 2013 ASEE Annual Conference (Atlanta). http://www.asee.org/public/conferences/20/papers/6956/view



Institute of Museum and Library Services


## Results

The open online-course format provided a platform to launch a scalable data information literacy curriculum across the STEM disciplines.

- ✓ **58 STEM graduates students enrolled**
- ✓ **14 academic departments represented**
- ✓ **11 students completed a written DMP**

An evaluation survey of graduates (64% response) demonstrated a high-level of satisfaction in the course"

*"This course gave me good techniques which I will not only be able to implement in my current research in addition to what I have already been doing, but also use them in the rest of my career."*

### Six-month Follow-Up Assessment

Two Fall graduates have responded (100% response) to a follow-up survey to help determine how the DIL skills were applied.

- ✓ **2/2 created a file-naming structure**
- ✓ **1/2 employed a metadata schema**
- ✓ **All modules of the Data Management Course were found to be either "Useful" or "Very Useful"**

## Next Steps

*"I really liked the in-person lecture. Made it easy to set aside one block of time to go through all the information and have staff on-hand to answer questions."*

### Fall 2013 Workshop Series: "Flipped Classroom" Approach

- ✓ **Five sessions focus on Module topics 2-6**
- ✓ **Ready to use online content**
- ✓ **Hands-on training with actual data sets**
- ✓ **Questions and feedback opportunities**